NOAA Technical Memorandum NMFS-SEFSC-502

PRELIMINARY GUIDE TO THE IDENTIFICATION OF THE EARLY LIFE HISTORY STAGES OF ATELEOPODID FISHES OF THE WESTERN CENTRAL NORTH ATLANTIC

BY
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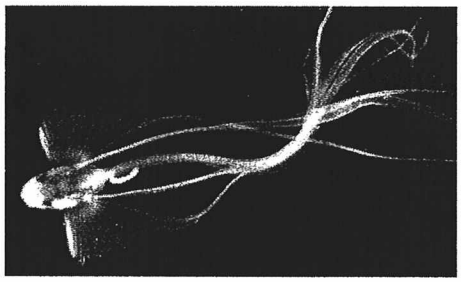

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National Marine Fisheries Service
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It will be a chapter entitled Ateleopodidae in the "Guide to the early life history stages of fishes of the western central North Atlantic".

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ATELEOPODIDAE: Jellynoses **by Kunio Amaoka**

The monotypic family Ateleopodidae (Order Ateleopodiformes) is widely distributed in the temperate and tropical waters of the Atlantic, Indian and Pacific oceans. They live in a wide depth range from about 30 m on the continental shelf to the deep sea down to 700m. Most species are characterized by a compressed elongate body covered with soft muscles, bulbous gelatinized snout, an obtuse spine expanding from behind the eye, a small dorsal fin just behind the head, and a long anal fin base extending to and continuous with the caudal fin - all extremely unique features. Therefore, this group had been an independent order Ateleopodiformes (Berg, 1940). Later the Ateleopodidae had been regarded as a member of the Lampriformes, but the monophyly of that order raised a doubt, because of extremely morphological diversity of the members. Olney et al. (1993) removed the ateleopodids from the lampriforms, and placed it in an unresolved trichotomy with stomiiformes and euryptergians. Nelson (1994) established the superorder Stenopterygii, and included Ateleopodiformes and Stomiiformes in it.

Seven nominal genera and 16 nominal species (Eschmeyer 1998) and 4 (or 3 genera) and about 12 species (Nelson, 1994; Froese & Pauly, 2003) are known in this family. However, taxonomic confusion is caused by the wide variation of morphometric features because of the soft body, morphological change accompanied by growth, and individual variation of meristic counts have produced many unidentified species (Mochizuki 1982; Shimizu 1983; Okamura 1985; Aizawa 2002). It is realized that species and even genera need to be reviewed (Stauche & Blache 1964; Mochizuki 1982; Smith 1995). Presently, I have no option but to list the ateleopodid species on the basis of recent faunal research, since their taxonomy is unresolved.

The ateleopodid fishes are known from two species of *Ijimaia*, two species of *Ateleopus* and one species of *Guentherus* (=*Melanogloea*) in the Atlantic Ocean (Blache et al. 1970; Smith 1995), and from two species of *Ijimaia* and one species of *Ateleopus* in the western central North Atlantic (McEachran & Fechhelm 1998, Shimizu 1983). In the Indo-Pacific, another species of *Ijimaia*, four other species of *Ateleopus* including one unidentified species (Aizawa, 2002), and one species of *Parateleopus* are known (Froese and Pauly, 2003).

The three western central North Atlantic species are listed in Table Ateleopodidae 1 and their depth distributions in Table Ateleopodidae 2. Larvae have never been reported from the western central North Atlantic. However, there is a photo of the dorsal view of a larva taken in situ by G. R. Dietzman of Woods Hole Oceanographic Institute (Figure Ateleopididae 1H). The fish was collected on dive 979, June 1, 1982 at 36° 21' N 73° 05'W, between 1515 and 1545 hrs. Surface temperature was 24.4° C, weather was overcast and seas 5-7 ft. It has an elongated and translucent tadpole body, a filamentous pelvic-fin ray extremely elongated beyond posterior end of body, large pectoral fins with an uppermost ray elongated into a filament, and elongated caudal fin rays. Dorsal

fin rays are not clear because photo is from the dorsal view. It is likely identified with an ateleopodid species in having a tadpole body shape, thoracic pelvic-fin origin with an elongated ray, and its general appearance. The meristic counts of the three western North Atlantic species, *Ijimaia antillarum, I. Loppei,* and *Ateleopus* sp. are given in Table 1 (McEachran & Fechhelm 1998, Shimizu 1983). According to McEachran & Fechhelm's key, two species of *Ijimaia* are easily separable by number of the caudal fin rays (5 vs. 14). However, the key is probably in error, since the anal fin is continuous with the caudal fin. The caudal fin rays of both species may not be different in number. *Ateleopus* is separable from *Ijimaia* by length of the pelvic fin, but there are no differences in the meristic counts. Consequently, it is hard to identify the larva by morphometric characters. There are no identified and described larva of any ateleopodid species from this area.

There are egg and larval collections from Japanese waters in the Western Pacific: key and note of the egg and newly-hatched larva of *Ateleopus japonicus* ? (Figure Ateleopididae 1 A & B taken from Mito 1960; Ikeda & Mito 1988) ; a probable ateleopodid larva (88 mm SL)(Toda in Nakabo & Nakamura 1988); a larva (69 mm SL) tentatively referred to as *A. japonicus* (Okiyama & Yanagiba 1993); a probable postlarva (170.8 mm SL) of *Ateleopus* sp. (Mochioka *et al.* 2002). These last three references are brief notes and abstracts of presentations at meetings, and none are identified with certainty to species level, nor described in detail. Recently, two postlarvae (185.1 mm SL & 258.0 mm SL), identified as *Ateleopus japonicus*, were described for the first time in the ateleopodids by Amaoka & Kobayashi (2003)(see Figure Ateleopididae 1F & G). These postlarvae are summarized below, together with the egg and yolk-sac larva (though the latter comes into question in identification).

Description: *Egg* (Figure Atleopodidae 1 A-B) – 3.28 mm in diameter, without oil globule and any ornament on the surface; perivitelline space wide.

Newly-hatched larva (yolk-sac larva) – 12.0 mm TL (Figure Ateleopodidae 1 C-E). Body elongated, with a large yolk-sac of 2.80 mm in diameter; myomeres more than 100; dorsal, pectoral and pelvic fins already developed, fin rays not visible; eyes well projected outward; no distinct pigmentation on body and fins.

Postlarvae – 185.1 mm SL (Figure Ateleopodidae 1F) & 258.0 mm SL (Figure Ateleopodidae 1G). Coloration of small specimen— head, axial muscles of body, internal organs, pectoral and pelvic girdles, and interradial portion of anal fin milky-white; other portions paler or almost translucent (entire body almost translucent in life); longitudinal series of small, milky-white spots slightly below mid-height of dorsal-fin fold; series of smaller, indistinct, milky-white spots along dorsal margin of dorsal fin-fold; 21 orange vertical bands sub-regularly arranged on lateral body muscle between posterior part of internal organs and near 118th ray of anal fin, of varying size and color density; single large, orange blotch on top of head and large, crescent-like, orange blotch

behind gill opening; series of yellowish lines sub-regularly arranged on basal part of anal fin between 9th and 83rd rays. Coloration of large specimen— 22 vertical orange bands on lateral body muscle from anterior portion of alimentary canal to near base of caudal fin; single orange blotch behind gill opening and top of head; reddish spot on dorsal-fin membrane between 1st and 2nd rays; some milky-white spots (yellowish? in life) on fin membrane between 1st and 4th dorsal-fin rays; 19 yellowish lines sub-regularly arranged along basal part of anal fin between 7th and 114th rays. Fine melanophores somewhat thickly distributed on dorsal portion of lateral body muscle, on top of head, and along base of anal fin; other distinct melanophores on entire pectoral-fin membrane between 1st and 2nd rays and on distal pectoral-fin membrane between 3rd and 4th rays; many melanophores along marginal portion of anal-fin membrane between 1st and about 97th rays.

Morphological characters— Body compressed, elongate, tapering to caudal fin; translucent dorsal-fin fold from just behind dorsal fin extending to base of caudal fin, no pterygiophores or fin rays in this fold. Translucent anal-fin fold extends from just behind anus to base of caudal fin, including many anal-fin pterygiophores with fin rays. Abdominal cavity elongated, formed by thin, translucent membrane; intestine originating from postero-dorsal part of triangular liver, running along dorsal and posterior walls of cavity to anus. Pair of tubular structures runs from site near and below pectoral-fin base to point above anal-fin origin. Anus opening slightly behind anterior 1/4 of SL.

Head small, length about 10-11% of SL; dorsal contour straight, ascending to origin of dorsal fin; dorsal surface deeply concave before interorbital region, flat posteriorly. Ventral contour with wide, shallow depression between posterior end of downward-projecting lower jaw and origin of pelvic fin. Large, obtuse spine projects from posterior margin of eye. Gill opening close to and below origin of dorsal fin. Snout broadly rounded, gelatinized. Eye small, diameter about half snout length.

Mouth large, oblique, anterior tip of lower jaw projecting beyond tip of upper jaw when mouth closed; 4 small, canine-like teeth on tip of upper jaw, teeth absent on lower jaw in large specimen; no teeth on either jaw in small specimen. Posterior end of maxilla extends to below middle of eye or a little beyond this point.

Dorsal-fin origin close to posterior limit of head (approx. 12-13 % of SL), its base about equal to snout length; 1st and 2nd rays elongate, reaching above 4th orange band in large specimen (rays broken at tip, subequal to head length in small specimen). Anal-fin origin immediately behind anus, fin deepest near 50th ray, depth about 80% (50% in small specimen) of head length. Pectoral fin just behind gill opening, fin rays well developed, extending to middle of intestinal tract. Pelvic fin below gill opening, midway between tip of isthmus and base of pectoral fin; pelvic girdle well expanded outwardly; fin rays well developed; anterior 3 rays elongate, extending to near middle of intestinal tract in large specimen (rays of smaller specimen broken at time of collection, but previously observed extending to near anterior 1/3 of body while swimming).

Caudal-fin rays well developed, united with anal fin. Caudal skeleton with 4 plates, uppermost plate largest, others small, of similar shape and size. Dorsal and ventral portions of lateral body muscles, head muscles behind eye, and elevator and depressor muscles of dorsal and anal fins well developed; single small muscle anterior to dorsal-fin origin, many small muscles irregularly arranged slightly below mid-height of dorsal-fin fold from posterior base of dorsal fin along anterior 3/4 of trunk.

Notes: A length increase of some 73 mm between the present small and large postlarvae was concurrent with the development of many melanophores on the body and fins, the development of teeth on the upper jaw, and reductions in the length of the dorsal- and pelvic-fin rays. A comparison among the postlarvae and available juvenile and adult forms showed a decrease in standard length during the interval from postlarva to juvenile as observed in leptocephalus larvae and the bothid *Chasnanopsetta* larva. In the identification of ateleopodid larvae there are many difficulties, because the meristic counts show no distinct differences between species, adult taxonomy of this group is not established, and morphological and color characters rapidly changed during larval, juvenile and young stages.

Table Ateleopodidae 1. Meristic characters of the species of the Family Ateleopodidae

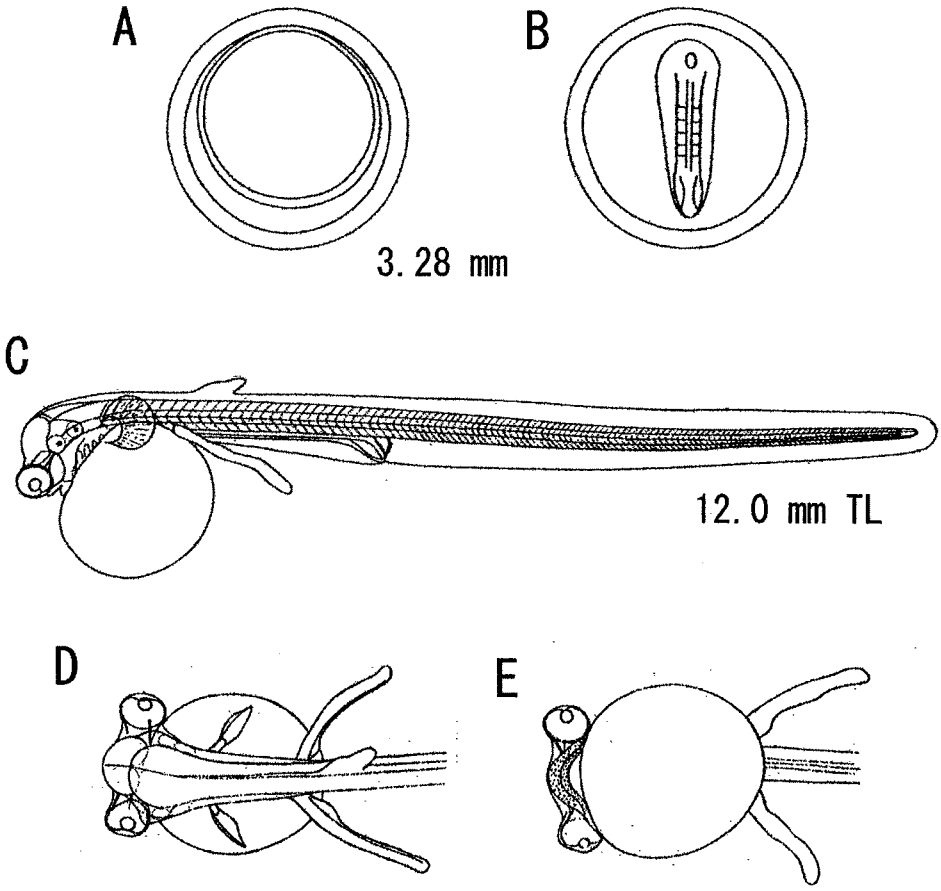
Species	Fin rays								
	Dorsal	*Anal	Caudal	Anal+Caudal	Pectoral	**Pelvic	Branchiostegals	Vertebrae	Gill rakers
Ijimaia									
antillarum	9	75	5	80	14	3	7	126	10
loppei	9-10	**66-73**	**14**	80-87	13-14	1	7		8-10
loppei	9-10			80-87	13-14	1-2			8-10
Ateleopus									
sp.	9			80	11	3			9

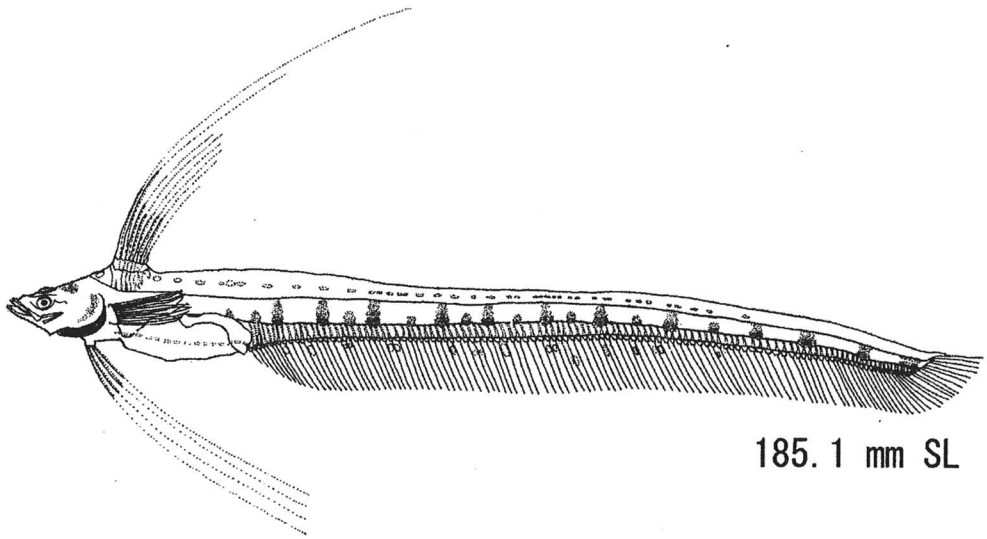
*Bold letters depict an error since anal & caudal fins continuous, see text for explanation
** Olney et al. 1993 note that there are 6 pelvic rays with medial 4 rays reduced

Table Ateleopodidae 2. Depth, distribution and source of the species of the Family Ateleopodidae

Species	Depth (m)	Area	Source
Ijimaia			
antillarum	439-549	Cuba, Gulf of Mexico	McEachran & Fechhelm 1998
loppei	30-692	Gulf of Mexico	McEachran & Fechhelm 1998
loppei	332-680	Suriname	Shimizu 1983
Ateleopus			
sp.	?	Suriname	Shimizu 1983

Figure Ateleopodidae 1. A & B) *Ateleopus japonicus*? eggs 3.28 mm in diameter, off Totoro, Miyazaki Prefecture. From Mito (1960) and Ikeda and Mito (1988); C) *Ateleopus japonicus*? newly-hatched larva 12.0 mm TL, off Totoro, Miyazaki Prefecture. From Mito (1960) and Ikeda & Mito (1988); D & E) *Ateleopus japonicus*? dorsal & ventral view of head of newly-hatched larva 12.0 mm TL; F) *Ateleopus japonicus,* 185.1 mm SL, HUMZ 185291, surface near breakwater, dip net, Nagato city, Yamaguchi Prefecture, Sea of Japan. From Amaoka & Kobayashi (2003); G) *Ateleopus japonicus,* 258.0 mm SL, HUMZ 185292, 10-20 m deep, mid-water trawl, Hagi city, Yamaguchi Prefecture, Sea of Japan. From Amaoka & Kobayashi (2003); H) ateleopodid larva ? from in situ photo by G. R.. Dietzman.





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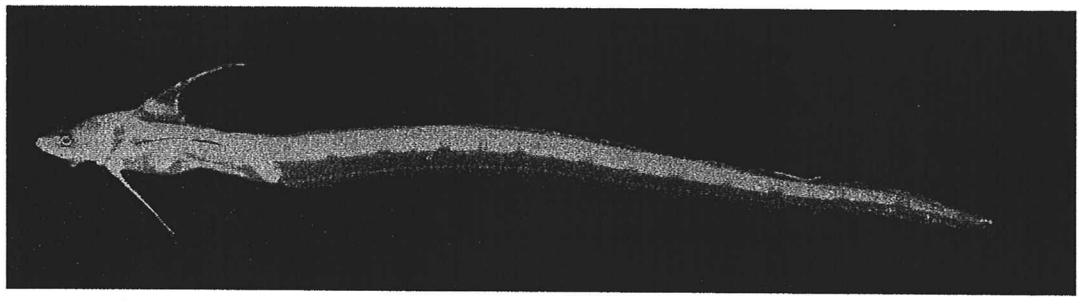

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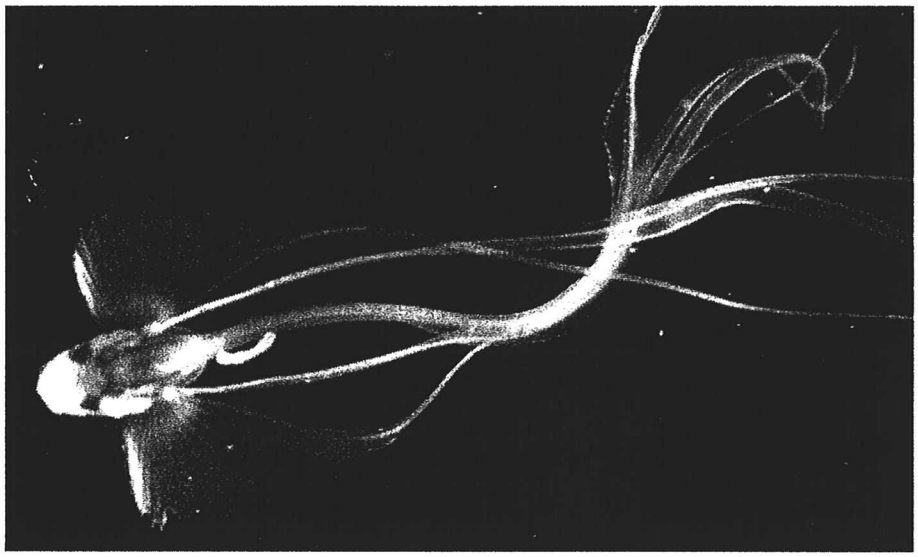

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